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TWO NEW INDO-WEST PACIFIC CARDINALFISHES OF THE GENUS *APOGON*

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Recent deep-SCUBA collections of coral reef fishes in the Solomon, Palau and Cocos-Keeling Islands have yielded two closely related species of *Apogon.* These are described herein and their subgeneric relationships discussed.

All measurements were made with dial calipers. Gillrakers counts include all rudiments. The raker at the angle of the arch is included in the lower arch count. The last dorsal and anal rays are a composite of two elements divided to the base; they are counted as one. Radiographs have been examined for all specimens.

Type-material is deposited at the following museums: Academy of Natural Sciences, Philadelphia (ANSP); Australian Museum, Sydney (AMS); Bernice P. Bishop Museum, Honolulu (BPBM); California Academy of Sciences, San Francisco (CAS); Rijksmuseum van Natuurlijke Historie, Leiden (RMNH); National Museum of Natural History, Washington, D.C. (USNM).

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Apogon dispar, new species

Figure 1

Diagnosis: A species of *Apogon* with a narrow, red band from the tip of the snout to the base of the caudal fin, ending in a squarish red spot; two small red spots behind and slightly above the eye; and caudal fin lobes broadly tipped with red.

Description: For general shape and pigment pattern see Figure 1. Proportions for nine of the 14 specimens 37–48 mm SL (as percent of standard length with holotype in parentheses): body depth (32) 28–32; head length (37) 36–40; eye length (12) 11–12; snout length (10) 9–12; bony interorbital width (7) 7; upper jaw length (18) 17–18; caudal peduncle depth (10) 10–13; caudal peduncle length (28) 28–31; dorsal spine length—first (1) 1–2, second (11) 10–11, third (17) 15–17, fourth (15) 14–15, last (14) 13–14 (spine is in second dorsal); anal spine lengths—first (3) 2–3, second (14) 14–15; pectoral fin length (20) 20–21; pelvic fin length (18) 18–21.

Dorsal fin VII—I,9 except one with VII—I,8; anal fin II,8 except one II,9; pectoral fin (both sides counted) 13(11) or 14(5), frequencies in parentheses; pelvic fin I,5; principal caudal rays 9+8; secondary caudal rays 6–10 above and 7–10 below; well developed gillrakers 21–25 (4–5+17–20), including rudiments 23–26 (0–3+4–5; 17–20+0–1), the holotype 0+5–18+1; pored lateral line scales 25; transverse scale rows above lateral line 2; median predorsal scales 4 or 5; circumpeduncular scales 12–13 (5–2–5 or 6); other scale counts could not be taken because of lost scales.

Premaxilla with two rows of teeth anteriorly becoming a narrow band on the side; all teeth villiform with the outer teeth larger than those of the inner row. Dentary with two rows of teeth anteriorly becoming one row on the side, all villiform and about the same size; vomer with one row of three small teeth on each side; none to three teeth on the palatine, no teeth on ectopterygoid or endopterygoid, occasionally teeth on base of basihyal.

Vertebrae 10+14; basisphenoid present; supramaxilla absent; 2 predorsals; 2 dorsal spines on the first pterygiophore; 7 epipleural ribs; 5 free hypurals; 3 epurals; 1 pair of uroneurals; suspensory pharyngeal present; 4 upper pharyngeal tooth patches; 7 branchiostegal rays; no hidden eighth dorsal spine; posttemporal serrated; preopercular ridge smooth, ventral and posterior edges serrated; infraorbitals smooth; shelf on third infraorbital.

Swim bladder with a single rete bundle and gas gland; the presence of an oval could not be established.

Coloration: From an Ektachrome transparency taken soon after death: Most of body translucent with orange-red and white markings; an orange-red stripe extending from tip of lower jaw to anterior margin of eye, thense continuing as a narrow post-ocular stripe, ending at base of

FIG. 1. *Apogon dispar*, holotype, BPBM 9378, 44.1 mm SL, Palau Islands, photographed freshly fixed in formalin.

caudal fin in a squarish spot; a small white spot above this orange-red spot; two small reddish spots behind and slightly above eye; caudal fin lobes broadly tipped with red; cheek and abdomen silvery.

Color in 55% isopropyl alcohol: All fins pale and translucent; a faint dark band along midside becoming a diffuse basicaudal mark; scales above lateral stripe outlined with black chromatophores; a small patch of dark chromatophores on nape behind and slightly above eye; dusky stripe on snout to tip of lower jaw; peritoneum white with many small dark chromatophores; intestine white with few dark chromatophores, stomach becoming blackish with numerous chromatophores. Coloration of the Cocos-Keeling Island specimens similar in 70% ethyl alcohol, except lobes of caudal fin dusky.

Distribution: *Apogon dispar* is known from 14 specimens taken at the Palau and Solomon Islands in the Pacific Ocean and from Cocos-Keeling Islands in the Indian Ocean, at depths of 18–58 m.

Holotype: BPBM 9378 (44.1 mm SL), Palau Islands, Augulpelu Reef at southwest end, small cave at base of drop-off, depth 36 m, 13 April 1970, J. E. Randall.

Paratypes: BPBM 17017 (2 specimens, 44.3–44.8 mm), USNM 212134 (2, 45.8–48.2), USNM 212135 (1, 44.3, cleared and stained), CAS 30648 (1, 48.1), Solomon Islands, Florida Island, south side of Tanavula Point, 09°02′44″S, 160°04′07″E, vertical reef wall with caves, 18–37, 30 July 1973, Randall and G. R. Allen. ANSP 128364 (6, 21.7–38.1) Cocos-Keeling Islands, Turk Reef, vertical face, 51–58 m, 25 March 1974, W. F. Smith-Vaniz and P. Colin. ANSP 128365 (1, 38.6) Cocos-Keeling Islands, Turk Reef, drop-off reef face and cave, 45–49 m, 8 March 1974, Smith-Vaniz and Colin.

Etymology: The latin adjective *dispar*, meaning unlike or different, is used because of the unusual body shape and coloration of this *Apogon*.

TABLE 1. Frequency distributions of selected characters of *Apogon dispar* and *Apogon melanoproctus*.

	Upper arch gillrakers				Total gillrakers					Second dorsal spine in % of SL			
	5	6	7	8	23	24	25	26	27	10	11	12	13
A. dispar	6*	6	1	–	1	5*	5	2	–	2	5*	–	–
A. melanoproctus	–	2	9*	1	–	–	2	8*	2	–	5*	5	1

	Caudal peduncle length in % of SL						Body depth in % of SL						
	26	27	28	29	30	31	28	29	30	31	32	33	34
A. dispar	–	–	2*	4	1	2	2	2	3	1*	1	–	–
A. melanoproctus	1	5*	6	–	–	–	–	–	–	3	4*	3	–

	Upper jaw length in % of SL				Pectoral fin in % of SL			
	15	16	17	18	20	21	22	23
A. dispar	–	2	3	4*	5*	2	–	–
A. melanoproctus	6	6*	–	–	–	–	7*	5

* Includes holotype

Apogon melanoproctus, new species

Figure 2

Diagnosis: A species of *Apogon* with a faint brown-orange caudal base with a white spot above; a white spot just behind the base of the soft dorsal fin; and a black area around the anus.

Description: For general shape and pigment pattern see Fig. 2. Proportions for the 12 specimens (as percent of standard length with holotype in parentheses): body depth (32) 31–34; head length (39) 36–39; eye length (12) 12–13; snout length (10) 8–10; bony interorbital width (7) 7–8; upper jaw length (16) 15–16; caudal peduncle depth (13) 12–14; caudal peduncle length (27) 26–28; dorsal spine lengths—first (1) 1–3, second (11) 11–13, third (17) 15–18, fourth (16) 15–16, last (13) 13–15 (spine is in second dorsal); anal spine lengths—first (3) 2–3, second (15) 14–15; pectoral fin length (22) 22–23; pelvic fin length (21) 19–22.

Dorsal fin VII—I,9; anal fin II,8 except one with II,9; pectoral fin (both sides counted) 14 (11), 13 (1), frequencies given in parentheses; pelvic fin I,5; principal caudal rays 9+8; secondary caudal rays 8–9 above and 8–9 below; well-developed gillrakers 22–24 (4–5+18–19), including rudiments 25–27 (2–3+4–5; 18–19+0–1), holotype 2+5–19 +0; pored lateral line scales 24; longitudinal row above lateral line 24;

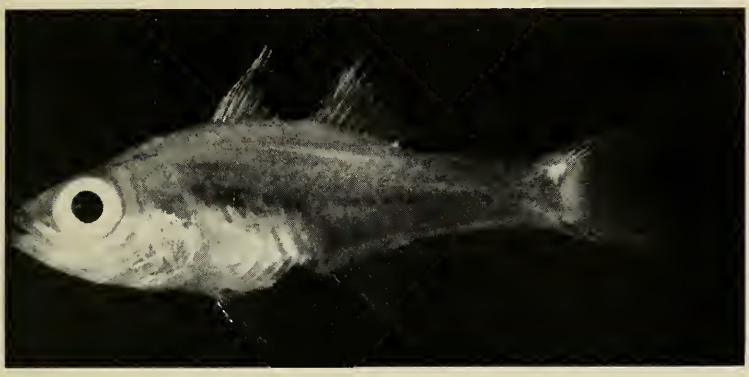

FIG. 2. *Apogon melanoproctus*, holotype, BPBM 15474, 40.0 mm SL, Solomon Islands, photographed freshly fixed in formalin.

transverse rows above lateral line 2; transverse rows below lateral line 6; median predorsal row 5; circumpeduncular scales 12 (5–2–5).

One row of teeth on dentary; two or three rows on premaxilla becoming one row on side; teeth on palatine few or absent; no teeth on vomer, ectopterygoid or endopterygoid; occasionally teeth on base of basihyal.

Vertebrae 10+14; basisphenoid present; supramaxilla absent; 2 predorsals; 2 dorsal spines on the first pterygiophore; 7 epipleural ribs; 5 free hypurals; 3 epurals; 1 pair of uroneurals; suspensory pharyngeal present; 4 upper pharyngeal tooth patches; 7 branchiostegal rays; no hidden eighth dorsal spine; posttemporal serrated; preopercular ridge smooth, ventral, and posterior edges serrated; infraorbitals smooth; shelf on third infraorbital.

Swim bladder with a single bundle and gas gland; the presence of an oval could not be established.

Coloration: From an Ektachrome transparency taken soon after death: Most of body translucent with brownish-orange, black and white markings; tip of lower jaw brownish-orange; snout and post-ocular region without a well defined stripe, but with some orange pigment; base of caudal with a brownish-orange bar and a smaller adjacent white spot positioned anterodorsally; another white spot at base of last dorsal ray; a black area around anus; cheek and abdomen silvery.

Coloration in 55% isopropyl alcohol: All fins pale and translucent; a faint basicaudal mark displaced slightly dorsal to the pored lateral line scales; a dusky stripe on snout to tip of lower jaw; only nape scales outlined with dark chromatophores; anal and genital openings surrounded by circular black spot; peritoneum white with many small dark chromatophores; intestine and stomach black.

Distribution: *Apogon melanoproctus* is known from one collection of 12 specimens from the Solomon Islands.

Holotype: BPBM 15474 (40.0 mm SL), Solomon Islands, Florida, Island, south side of Tanavula Point, 09°02′44″S, 160°04′07″E, vertical reef wall with caves, 18–37 m, 30 July 1973, J. E. Randall and G. R. Allen.

Paratypes: (All same data as holotype) USNM 212133 (1 specimen, 38.8 mm, cleared and stained), USNM 212132 (2, 36.0–38.1), RMNH 27056 (2, 36.5–37.5), BPBM 15475 (2, 37.2–38.0), CAS 30649 (2, 30.1–37.3), AMS I. 17888-001 (2, 34.5–37.2).

Etymology: The name *melanoproctus* is a Greek noun from *melanos*, black, and *proktos*, anus. It refers to the black pigment that completely surrounds the anus.

Discussion: These two species are closely related to each other, based on the combination of seven visible first dorsal spines, two predorsal bones, a pair of uroneurals and similar body shapes and dentition. The combination of two predorsal bones and seven spines in the first dorsal is unusual in seven-spined species of *Apogon* and is known only to occur in *Apogon queketti* Gilchrist, out of the approximately 49 seven-spined species examined by Fraser (1972) in the subgenera *Nectamia* and *Pristiapogon*. The new species do not belong to the group of species that includes *A. queketti* nor do they belong in *Pristiapogon*. We tentatively assign the new cardinalfishes to the subgenus *Nectamia*. The subgeneric classification of *Apogon* proposed by Fraser (1972) was based on the osteological study of about 80 of the approximately 130 valid species. Future evaluation (now in progress) of the subgenera and species groups is necessary before stable and, hopefully, definitive understanding of this large genus is attained. *Apogon dispar* and *melanoproctus* may eventually warrant subgeneric designation.

Like other deeper-dwelling reef apogonids, we expect these species to have wider distributions than are presently recorded.

Literature Cited

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